

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended) A semiconductor substrate comprising:

a front face and a rear face that are both mirror-polished,

wherein said semiconductor substrate

meets an SFQR value ≤ 70 (nm) as a flatness of the front face, and

contains boron at a concentration higher than or equal to 5×10^{16} (atoms/cm³) and lower than or equal to 2×10^{17} (atoms/cm³);

wherein a crystal layer is provided on the front face; and

wherein a minimum value of the concentration of boron [B] (atoms/cm³) is defined for a required thickness t (μm) of the crystal layer within said range of said concentration of boron, based on a relational equation

$$[B] \geq (2.2 \pm 0.2) \times 10^{16} \exp(0.21t).$$

2-3. (Canceled)

4. (Previously Presented) The semiconductor substrate according to claim 1, wherein a maximum value of a thickness t (μm) of the crystal layer is defined for a required concentration of boron [B] (atoms/cm³), based on a relational equation

$$[B] \geq (2.2 \pm 0.2) \times 10^{16} \exp(0.21t).$$

5. (Previously Presented) The semiconductor substrate according to claim 1, wherein the crystal layer is a silicon crystal layer formed by epitaxial growth.

6. (Previously Presented) The semiconductor substrate according to claim 1, wherein the crystal layer is a silicon-germanium alloy crystal layer.

7. (Previously Presented) The semiconductor substrate according to claim 1, wherein the crystal layer is a layer in a layered structure of a silicon-germanium alloy crystal layer and a silicon crystal layer.

8. (Original) The semiconductor substrate according to claim 7, wherein the silicon crystal layer is formed in an SOI structure in which the silicon crystal layer is separated by a silicon oxide layer.

9. (Previously Presented) The semiconductor substrate according to claim 1, wherein said semiconductor substrate is an SOI substrate; and wherein the crystal layer is an upper silicon crystal layer separated by a silicon oxide layer.

10. (Original) The semiconductor substrate according to claim 9, wherein the SOI substrate is formed by a SIMOX method.

11. (Original) The semiconductor substrate according to claim 9, wherein the SOI substrate is formed by a bonding method.

12. (Original) The semiconductor substrate according to claim 1, wherein the rear face is in an exposed state, or a natural oxide film having a thickness of 1 (nm) or less is formed on the rear face.

13. (Original) The semiconductor substrate according to claim 1, wherein carbon is contained at a concentration of 1×10^{15} (atoms/cm³) or higher.

14. (Currently Amended) A semiconductor device, comprising:
a semiconductor substrate having a front face and a rear face that are both mirror-polished, said semiconductor substrate meeting an SFQR value ≤ 70 (nm) as a flatness of the front face, and containing boron at a concentration higher than or equal to 5×10^{16} (atoms/cm³) lower than or equal to 2×10^{17} (atoms/cm³), wherein a crystal layer is provided on the front face; and wherein a minimum value of the concentration of boron [B] (atoms/cm³) is defined for a required thickness t (μm) of the crystal layer within said range of said concentration of boron, based on a relational equation

$$[B] \geq (2.2 \pm 0.2) \times 10^{16} \exp(0.21t); \text{ and}$$

a semiconductor element formed on the front face of said semiconductor substrate.

15. (Withdrawn) A manufacturing method of a semiconductor substrate, comprising the steps of:

forming a silicon wafer by doping with boron at a concentration higher than or equal to 5×10^{16} (atoms/cm³) lower than or equal to 2×10^{17} (atoms/cm³);

mirror-polishing a rear face of a front face of the silicon wafer, the front face being a face on which a crystal layer is to be formed;

mirror-polishing the front face of the silicon wafer to achieve an SFQR value of the silicon wafer ≤ 70 (nm); and

forming a crystal layer on the front face of the silicon wafer.

16-18. (Canceled)